Bowdoin College, and in 1824 he became Professor of Latin and Greek in the same institution. He held this professorship until 1865, and during a part of this time (1842–44) he also had charge of the department of Rhetoric and Oratory. During the last twelve years of his life he held the Professorship of Natural and Revealed Religion at Bowdoin; and after the resignation of President Chamberlain, in 1883, until his own death, he was Acting President of the College. He presided at the Commencement exercises on Thursday, July 10, only three days before his death, and at the Commencement dinner on the same day. He made several speeches at the dinner, introducing the guests who were present; and in the evening he held a reception at his house for the graduating class. The next day, Friday, he took a long drive; and on Saturday he went with his family to Squirrel Island, where he died on Sunday. He attended church Sunday morning, and on his way back to the hotel he was attacked with faintness and died in a few minutes.

Professor Packard was identified with the history of Bowdoin College during more than sixty years. He was the teacher of Hawthorne and Longfellow, and of many others of whose names Bowdoin is justly proud. He published an edition of Xenophon's Memorabilia in 1839, which appeared in a revised form in 1841. He edited the works of his father-in-law, Dr. Appleton, formerly President of Bowdoin College, and wrote the Memoir in the first volume. He sometimes contributed to the North American Review, the Bibliotheca Sacra, and other periodicals. In 1869 he received the degree of Doctor of Divinity from Bowdoin College.

## BENJAMIN SILLIMAN.

BENJAMIN SILLIMAN, who died at New Haven, January 14, 1885, was the second of a name which will always be gratefully remembered among the cultivators of physical science in the United States.

His father, whose death in 1864 was noticed in the sixth volume of these Proceedings, was one of the pioneers in developing the study of physical sciences in this country. Becoming a Professor in Chemistry at Yale College at an early age, he kindled by his enthusiastic teaching a taste for experimental and natural science, not only in his own college, but also throughout the country; and by establishing and editing "The American Journal of Science" through a period of twenty-eight years, not only aided and stimulated his countrymen in their scientific labors, but also made their names and work familiar

to men of science abroad. Into the pleasant home which his father had established at New Haven, Benjamin Silliman, Jr. was born, December 4, 1816.

His mother was the daughter of Jonathan Trumbull, Governor of Connecticut from 1798 to 1809. Thus favored in his parentage, the son breathed from the first the scientific atmosphere which surrounded the father; and it is not surprising that he rapidly acquired a large measure of his father's enthusiasm and a strong inclination to scientific pursuits. Graduated at Yale College with the distinguished class of 1837, he immediately became his father's assistant, and the College Laboratory gave him in this position opportunities for experiment and study of which he assiduously availed himself. By the year 1842 he had, without outside help, of which the country afforded then but little, acquired sufficient knowledge of general and analytical chemistry and mineralogy to enable him to instruct others on those subjects, and he received a few pupils in the old Laboratory of the College, — in what would now be called very narrow quarters. One of the earliest of these was Mr. John P. Norton, who studied with him in 1842–43. Another was Mr. T. Sterry Hunt, who began his studies with Mr. Silliman in 1845. In 1846, a memorial to the Corporation of Yale College by himself, adopted and seconded by his father, urging the official recognition and organization of a new department of advanced science, led to the establishment of the "Department of Philosophy and the Arts." The School of Applied Chemistry was organized under this department, and placed in the charge of Mr. Silliman, as Professor of Chemistry as applied to the Arts, and Mr. John P. Norton, as Professor of Agricultural Chemistry. This School was successful from the beginning, and, if not the first, was one of the first schools of practical science connected with any American college. From this beginning grew the Yale Scientific School, which, after the generous gifts of Mr. Sheffield, expanded into the world-renowned Sheffield Scientific School.

Among the six students of the first year after the new organization were three, G. J. Brush, S. W. Johnson, and William H. Brewer, who subsequently became distinguished Professors in the Sheffield Scientific School.

For thus founding and successfully conducting through the days of small beginnings one of the first schools of experimental and applied science in the United States, Professor Silliman is deserving of the highest praise. And this was unquestionably the most important achievement of his life.

Professor Silliman's connection with the Yale Scientific School was interrupted by his removal to Louisville in 1849, where for five years he discharged the duties of Professor of Medical Chemistry and Toxicology in the Medical College of that place. When he returned to New Haven, in 1854, to enter upon instruction in the Academic and Medical Departments of Yale College, recently resigned by his father, the direction of the Scientific School had passed into other hands, but he retained a nominal connection with it until 1869. In 1870 he resigned his connection with the Academic Department of the College, but he retained his connection with the Medical Department until his death.

In 1838, when twenty-two years old, Mr. Silliman became associated with his father in the editorship of "The American Journal of Science and Arts," the Journal being then in its twenty-first year. This arrangement continued until the close of 1845, when the first series of fifty volumes was ended; after which his brother-in-law, Professor James D. Dana, was associated with Mr. Silliman in the editorial duties. Up to the present time, 1885, his name has stood among those of the editors of the Journal now for nearly half a century. Besides devoting a large amount of time to the work of editing, Mr. Silliman published in the Journal more than fifty papers, embracing a large range of subjects. Most of these were descriptions of minerals, chiefly from the chemical side, which present points of great interest. We may mention the paper on Calcareous Corals (1846); on Emerald Nickel, from Texas, Pa. (1847); on the Results of the Optical Examination of the Micas (1850); on Gay-Lussite from near Ragtown, Nevada (1866), in which the occurrence of this mineral in process of formation is described; on Priceite, a new Borate of Lime (1837); on Platinum and Iridosmine at the Cherokee Gold Mine, California (1837); on Tellurium Ores of Colorado (1874); on the Occurrence of Gold with Sheelite in Idaho (1877); on Jarosite in Arizona (1879); on Vanadates, Chromates, and Tungstates in Arizona (1881); and on the Iron Mountain of Durango, Mexico (1882). Of equal interest were his papers on Meteorites, as those of Burlington, N. Y., of Lockport, N. Y., of Texas, of Concord, N. H., and of Shingle Springs, Cal. He also wrote on points in geology and physical optics, on the illuminating powers of gas, and on the photographic effect of the voltaic arc.

On the centennial of the discovery of oxygen gas by Priestley, celebrated at Northumberland, Pa., August 1, 1874, Professor Silliman prepared a full list of American contributions to chemistry up to the

date of the meeting. This was the result of a large amount of labor, and is a valuable historical work. It may be referred to for a complete list of Professor Silliman's papers up to this date.

Professor Silliman was the author of an elementary treatise on Chemistry, and also of a similar work, entitled, "First Principles of Physics, or Natural Philosophy." Both of these works were for a long time very extensively used as text-books throughout the United States, and of the first more than fifty thousand copies are said to have been sold. Soon after the Industrial Exhibition in New York, 1853, during which Professor Silliman had charge of the Chemical, Mineralogical, and Geological Department, he edited, in connection with Mr. Charles R. Goodrich, a large illustrated quarto volume, entitled, "The World of Science, Art, and Industry," and, in 1854, another similar volume, entitled, "The Progress of Science and Mechanism." One of the latest and most important of his literary works was a report to the National Academy of Sciences, as chairman of a committee appointed by them on the subject of the use of Sorghum as a source of sugar; and the last work of his life was a preparation of a biographical notice, for the same Academy, of his late friend and associate, Mr. J. Lawrence Smith.

In the department of Mineralogy Professor Silliman took an especial interest, and, as his means of collecting were large, he accumulated a fine cabinet, which in 1868 was sold to Cornell University, where it bears the name of the Silliman Cabinet. He also, by his gifts and personal exertions, made important additions to the magnificent collection of minerals at Yale College.

During the last twenty years of his life Professor Silliman's great energies were largely devoted to industrial interests of various kinds, and especially to mining. As a mining expert, he travelled often through the extreme length and breadth of the United States, and visited every important mining region both in this country and in Mexico, and his reports on mining interests have been very numerous, and have involved a great amount of work. He was inclined to such work by his mineralogical and mechanical tastes, and by his active habits, as well as from the force of circumstances. If he sometimes made mistakes of judgment, they were the result of an over sanguine and trustful temperament, not sufficiently regulated by the caution which the training of a mining school and the life of a mining camp gives to those who have been bred to the profession of a mining engineer. Certainly no one suffered from the consequences of his mistakes so greatly as himself.

Professor Silliman was a man of exceedingly generous nature and kindly disposition, and he will always be affectionately remembered by his friends. In society he was most genial, and his lively conversation exhibited broad interests and a wide range of general information. He was married in 1840 to Miss Susan H. Forbes, of New Haven, a most accomplished woman, who united with him to make their home exceedingly attractive to a very wide circle of relatives and friends. Their hospitality was unbounded, and was enjoyed by men of science from every quarter of the globe.

Professor Silliman had a fine physique, and his powers of endurance and of work were remarkable. He always enjoyed excellent health until 1880, when he was prostrated for some weeks by heart disease. From this he soon rallied, and, though conscious of a weakened constitution, was able to resume work with his usual energy. His last illness began in October last with a severe return of his heart complaint, complicated by an attack of pneumonia. From that time the decline was slow, but steady, to the end; and the unselfish and whole-souled nature of the man, which marked his entire life, was never more manifest than during his last days.

Professor Silliman was elected Associate Fellow of this Academy, May 28, 1851, and at his death his name was one of the oldest on its list.

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## FOREIGN HONORARY MEMBERS.

### GEORGE BENTHAM.

GEORGE BENTHAM, one of the most distinguished botanists of the present century, and at the time of his death one of the oldest, was born at Stoke, a suburb of Plymouth, September 22, 1800. He died at his house, No. 25 Wilton Place, London, on the 10th of September, 1884, a few days short of eighty-four years old. His paternal grandfather, Jeremiah Bentham, a London attorney or solicitor, had two sons, who both became men of mark, Jeremy and Samuel. The latter and younger had two sons, only one of whom, the subject of this memoir, lived to manhood. George Bentham's mother was a daughter of Dr. George Fordyce, a Scottish physician who settled in London, was a Fellow of the Royal Society, a lecturer on chemistry, and the author of some able medical works; also, of a